



AMU-161-90

November 8, 1990

Mr. J. L. Lyle, Director
Environmental Restoration Division
Idaho Operations Office, DOE
785 DOE Place
Idaho Falls, Idaho 83402

Subject: CPP-59 Closure Plan Submittal

Dear Mr. Lyle:

Attached are copies of the Closure Plan for CPP-59, the kerosene tank spill located west of ICPP 633, for submittal to EPA Region X and the State of Idaho. Your comments have been incorporated into the document and Wastren (Dan McNair) concurs with the resolution.

Please call Dee Williamson (6-5916) if you have any questions or require assistance in any form.

Sincerely,

A handwritten signature in cursive script, appearing to read "A. M. Umek", is written over a horizontal line.

A. M. Umek, Manager
Environmental Compliance and SIS Operations

OKE/pat

Attachments

cc: L. A. Green
W. N. Sato



Westinghouse Idaho Nuclear Company, Inc.

Box 4000 — Idaho Falls, Idaho 83403

**CLOSURE PLAN FOR
CPP-59, KEROSENE TANK OVERFLOW
(WEST OF ICPP-633)**

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EXECUTIVE SUMMARY

LDU CPP-59 is located inside the Idaho Chemical Processing Plant (ICPP) security fence just west of building CPP-633 at the corner of Fir Street and Olive Avenue. Two separate kerosene spills are known to have occurred here in September 1983. The first incident was on September 24, 1983, when approximately 200 gallons of kerosene overflowed from the kerosene bulk storage tank (WDS-100) vent line. When the tank overflowed, the foam fire protection line on the tank filled with kerosene. An unknown volume of the 200-gallon spill drained out a vent in the line, which is located outside the tank containment berm. It is estimated that less than 30% of the spill occurred outside the bermed area. The second spill occurred on September 29, 1983, when a tank truck was transferring kerosene to WDS-100. An uncalibrated level indicator resulted in approximately 60 gallons of kerosene overflowing to the soil. It is estimated that the entire volume of this spill was retained within the bermed area.

CPP-59 was identified as a Land Disposal Unit (LDU) in the INEL Consent Order and Compliance Agreement (COCA) based on the assumption that kerosene and degradation components could be hazardous wastes due to the characteristics of ignitability or toxicity. This Closure Plan is being submitted to comply with provisions of the COCA, which requires the submittal of a closure plan for each LDU.

As required by the COCA, a pre-closure sampling investigation was conducted at CPP-59 to determine the extent of soil contamination due to the kerosene releases. Soil samples were collected from shallow (4 to 6 feet) holes and deep (40 to 43.5 feet) boreholes to determine the extent of contamination. Four shallow holes inside the bermed area (representing the majority of the spill area), five shallow holes outside the bermed area, and two deep boreholes outside the bermed area were sampled to characterize the site. The holes outside the bermed area were intended to depict standard conditions associated with petroleum product use at ICPP including minor spills from off-loading activities, oil spills associated with vehicle usage, and product spills outside the berm. Soil samples were analyzed for volatile organic compounds (VOCs) and total petroleum hydrocarbons (TPH). Xylene, in low concentrations, (1 to 11 ppb) was the only VOC detected. Of the 47 samples analyzed, xylene was present in detectable concentrations in 5 samples, all outside the bermed area. TPH contamination was detected in 36 of the 47 samples collected. TPH values for the 13 samples collected inside the bermed area (majority of spill) averaged 9.3 ppm to a depth of 6 feet. Values for the 34 samples collected outside the bermed area averaged 159 ppm. Ninety-eight percent of the TPH is present in the upper 6 feet of the soil. Two samples of the 14 collected to depths greater than 6 feet showed traces of TPH. In both samples TPH values were less than 5 ppm. These levels are extremely low and pose no threat to human health, safety, or the environment.

In conclusion, all RCRA hazardous constituents detected at LDU CPP-59 were present below accepted limits for petroleum spills and pose no threat to human health, safety, or the environment. For these reasons, there does not appear

to be any basis for remediation or post-closure activities at this site. It is therefore being recommended that LDU CPP-59 be closed without removal actions. If any future activity is deemed necessary, it will be completed at that time under the upcoming INEL Interagency Agreement.

CLOSURE PLAN FOR
CPP-59, KEROSENE TANK OVERFLOW
(West of ICPP-633)

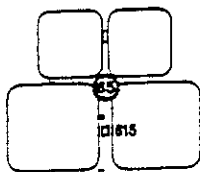
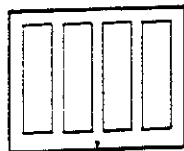
EPA Facility ID No: ID 4890008952
Owner/Operator: Dept. of Energy, Idaho Operations Office
785 DOE Place
Idaho Falls, Idaho 83402
(208) 526-1505
Facility Address: Idaho Chemical Processing Plant
Scoville, Idaho

1. FACILITY CONDITIONS

1.1 General Description

The kerosene-contaminated area designated as Land Disposal Unit (LDU) CPP-59 is located inside the Idaho Chemical Processing Plant (ICPP) security fence west of building CPP-633 at coordinates N 695,180; E 296,938 (see Figures 1 and 2). Kerosene (fuel oil #1) is shipped to the ICPP in tank trucks and stored in bulk storage tanks VES-WDS-100 and VES-WDS-101 (see Figures 2 and 3). Kerosene is routinely transferred through pipes between the tanks and the ICPP's calcining facilities (Waste Calcining Facility (WCF) to the east and New Waste Calcining Facility (NWCF) to the northeast). The area north of the kerosene tanks is utilized for off-loading petroleum products, vehicle parking and vehicle travel.

Kerosene is known to have been released to the environment twice in September 1983. On September 24, 1983, an operator noticed kerosene



WASTEWATER
TREATMENT
LAGOON

CPP S

CPP-59
N 695, 180
E 296, 938
Elevation 4
Note: ICPP

57

EAST PERIMETER

52

LODGE POLE STREET

57

CPP-59

1832

854

CODAR STREET

884

12

CYPRESS AVENUE

CHESTNUT AVENUE

CHESTNUT AVENUE

ELM AVENUE

674

811

812

1831

1804

1805

REDWOOD STREET

57

57

57

57

57

57

57

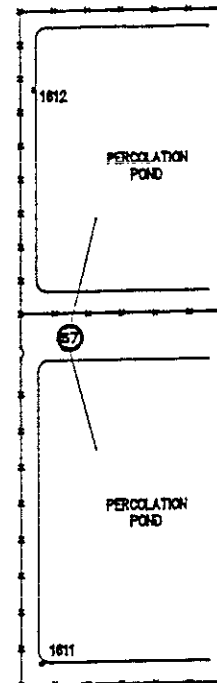
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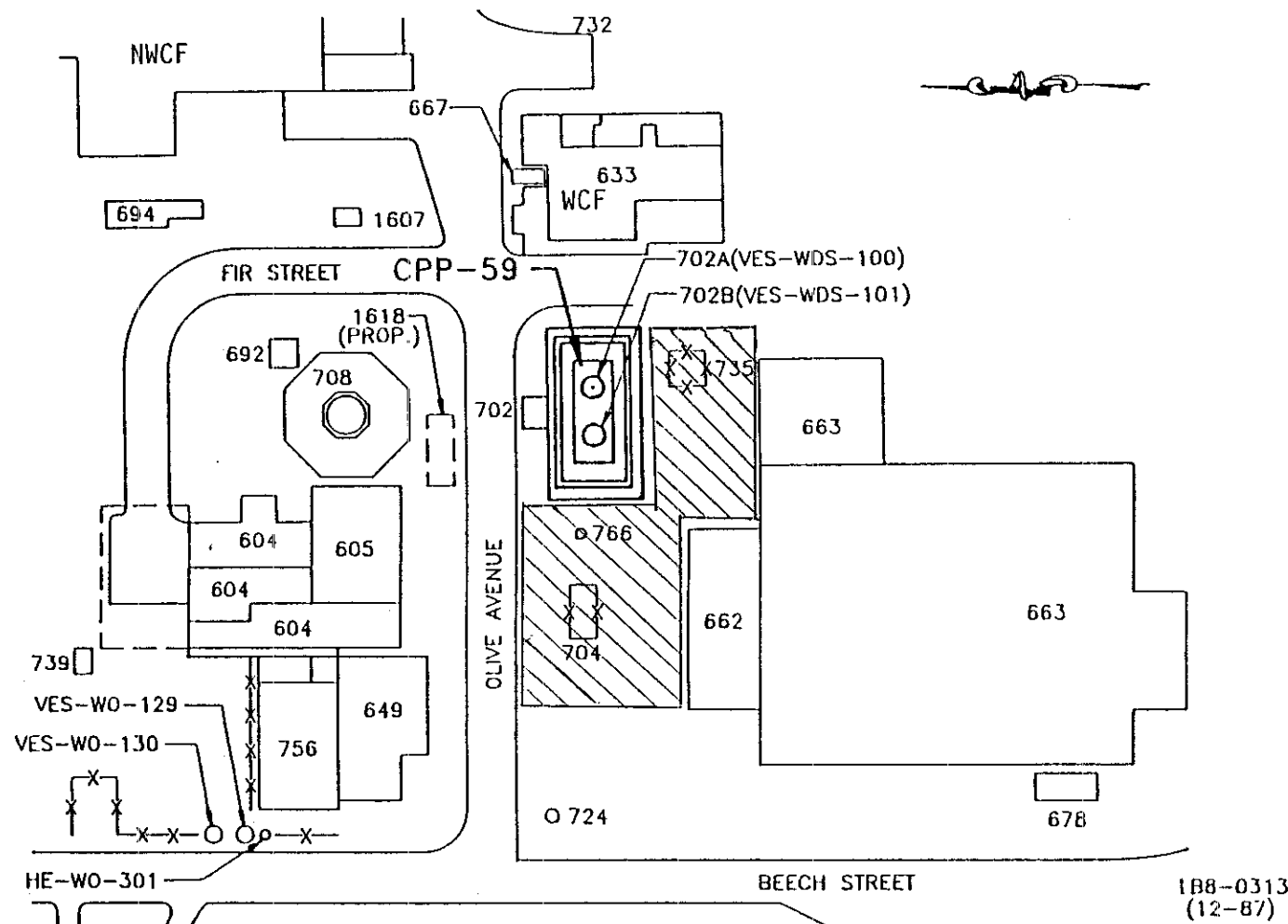
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
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PARKING
AREA



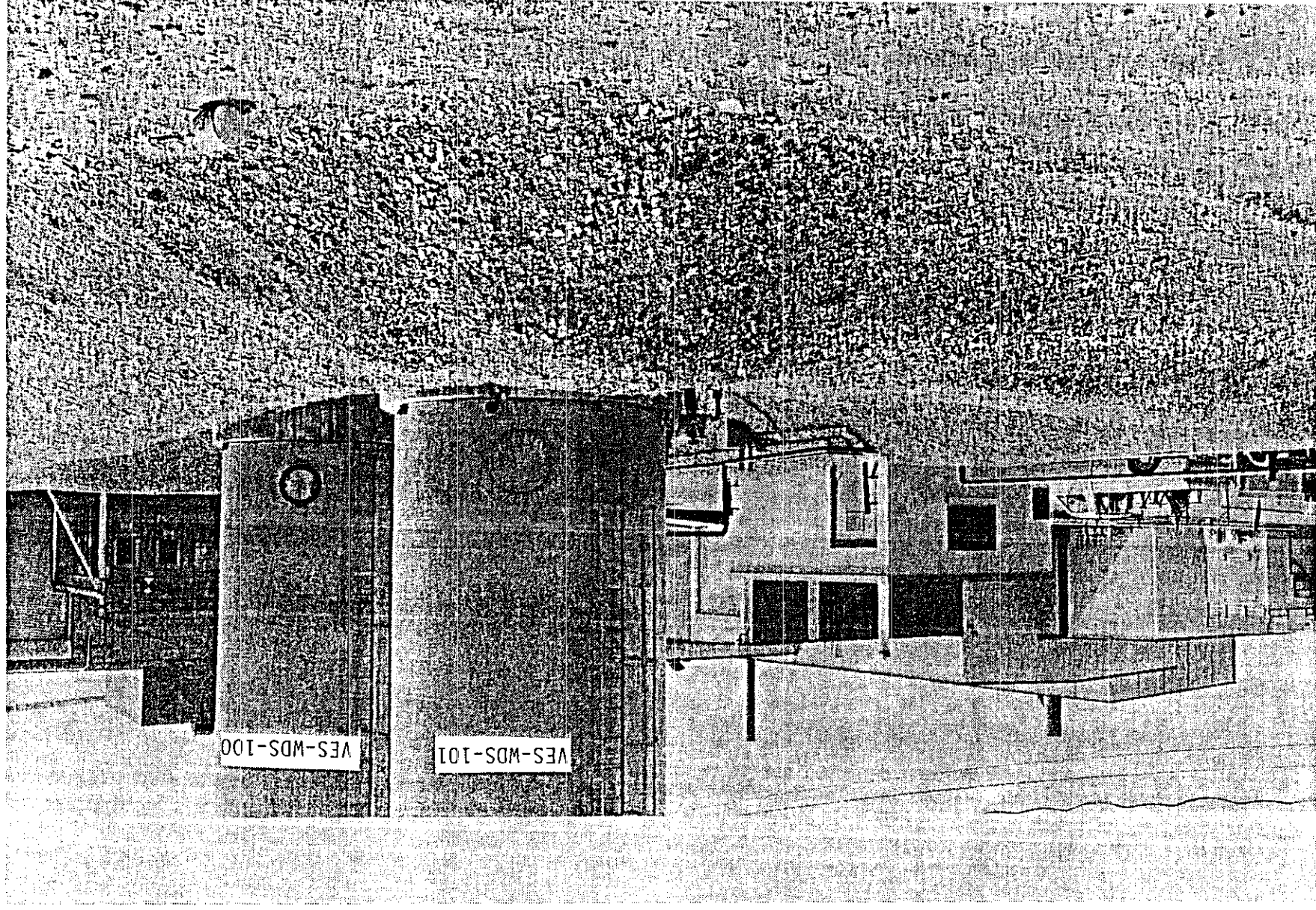


 Area unsuitable for drilling because of substation, underground utilities, and LET&D building.

0 100 200
SCALE IN FEET

FIGURE 2
SITE PLAN
LAND DISPOSAL UNIT CPP-59
IDAHO CHEMICAL PROCESSING PLANT

Figure 3. CPP-59 Photograph



REF ID: A661009395243

overflowing from the kerosene bulk storage tank (WDS-100).

Approximately 200 gallons overflowed. When the tank overflowed, the foam fire protection line on the tank filled with kerosene. Some of the kerosene drained out a vent in the line, which is located outside the tank containment berm. Another spill occurred at the unit on September 29, 1983, when a tank truck was transferring kerosene to WDS-100. The capacity of WDS-100 was exceeded due to an uncalibrated level indicator. Approximately 60 gallons of kerosene overflowed to the soil. It is estimated that the majority of the spill remained within the bermed area.

CPP-59 was initially declared a Land Disposal Unit (LDU) based on the potential ignitability of kerosene. Kerosene is potentially an ignitable waste. Since the actual flash point was not known at the time, it was assumed that the flash point was $< 140^{\circ}\text{F}$, and the kerosene was considered to be ignitable. However, the typical flash point of kerosene ranges from $150\text{-}185^{\circ}\text{F}$ (Budavari et al. 1989). Appendix A displays a Material Safety Data Sheet (MSDS), dated August 18, 1987, where Pensky-Martens Close Cup (PMCC) test methods showed that the typical kerosene used at the ICPP has a flash point of 160°F .

Operation records indicate that routine and systematic releases of kerosene have not occurred; additionally, the kerosene used at the ICPP is not ignitable (Appendix A). Characterization of this unit indicates that the presence of kerosene poses no risk to human health or the environment.

1.2 Unit Characterization Objectives

Land Disposal Unit CPP-59 was characterized in order to determine the residual concentration of kerosene present in the soil since the 1983 spill. The characterization data will be used in this closure plan as required under the COCA.

1.3 Closure Goals

The goal of this closure plan is to:

- Eliminate this unit from further consideration under the COCA, based on technical data indicating that the kerosene spill in 1983 poses no risk to human health or the environment.
- Meet the requirements of the COCA to submit a closure plan for CPP-59, as committed per letter to EPA Region 10 (January 1990).

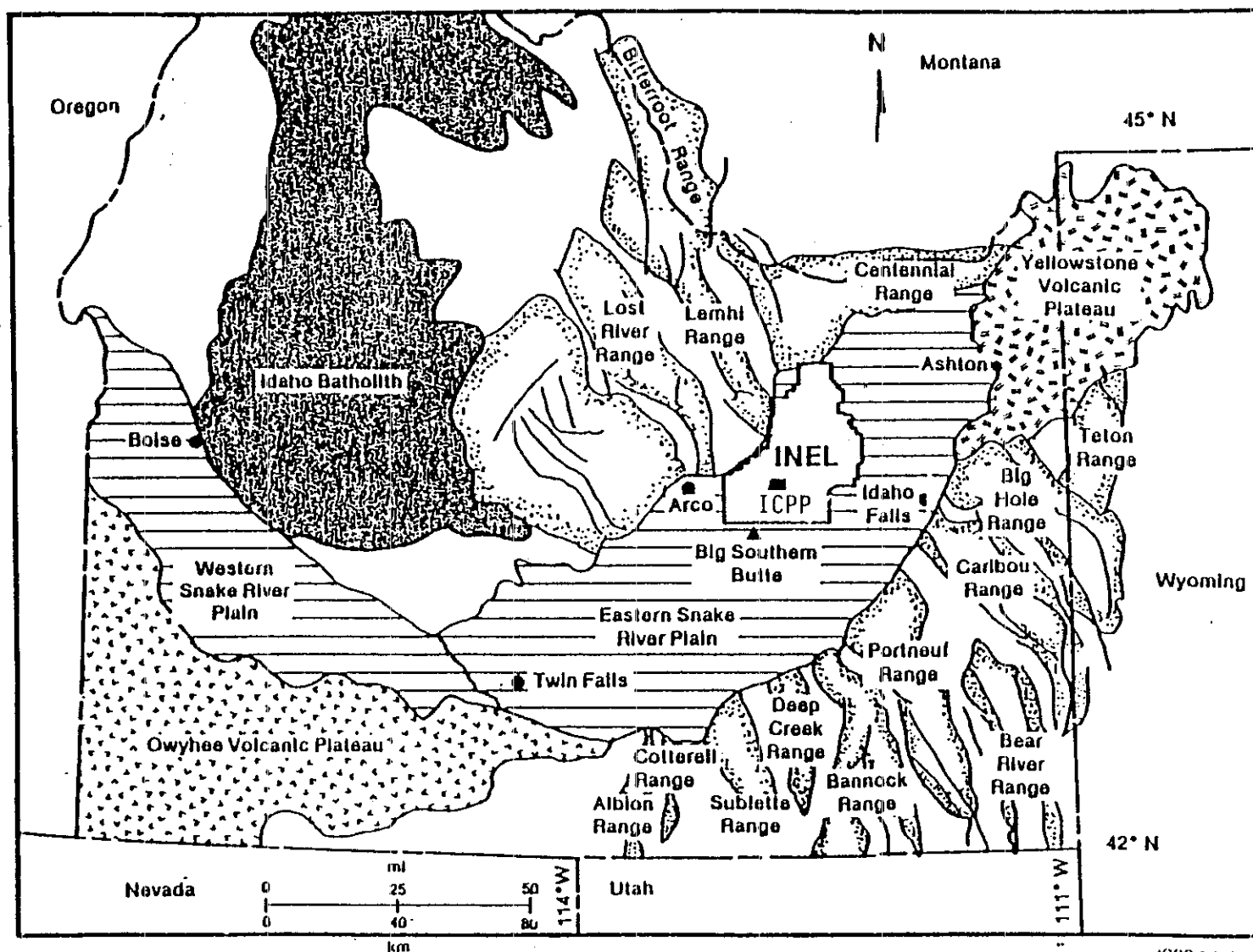
2. GEOLOGY

2.1 General Geology

The ICPP is located along the northern edge of the Eastern Snake River Plain (Figure 4). This portion of the plain is a structural and topographic basin 50 to 70 miles wide and 200 miles long, extending from the Snake River in the Twin Falls-Hagerman area north to Island Park. The present topography of the Eastern Snake River Plain (ESRP) is dominated by basalt flows and rhyolite buttes.

Surficial sediments at the ICPP consist of alluvial materials deposited by the Big Lost River. Figure 5 identifies the location of wells used to define a fence diagram of subsurface geology, as shown in Figure 6. These sediments consist of well graded gravels, sands, and intermittent silt and sandy clay lenses. Surface alluvium extends to the top of the basalt, generally around 35 to 50 feet. In many areas around the ICPP there exists a layer of fine-grained sandy clay and clayey or silty sand at the basalt/surface sediment interface.

The subsurface stratigraphy of the ESRP consists of thin (averaging < 25 feet) basaltic lava flows with numerous interbedded sediments and cinder zones. The interbed sediments consist of lacustrine, eolian, and alluvial material with source areas in the neighboring mountain ranges. These sediments also occur as fracture fillings in the basalt flows. Composition of the flows are mainly a very dark gray to black, variably



ICPP-A-14041
(2-87)

Figure 4. Generalized map of southern Idaho showing geographic and geologic features.

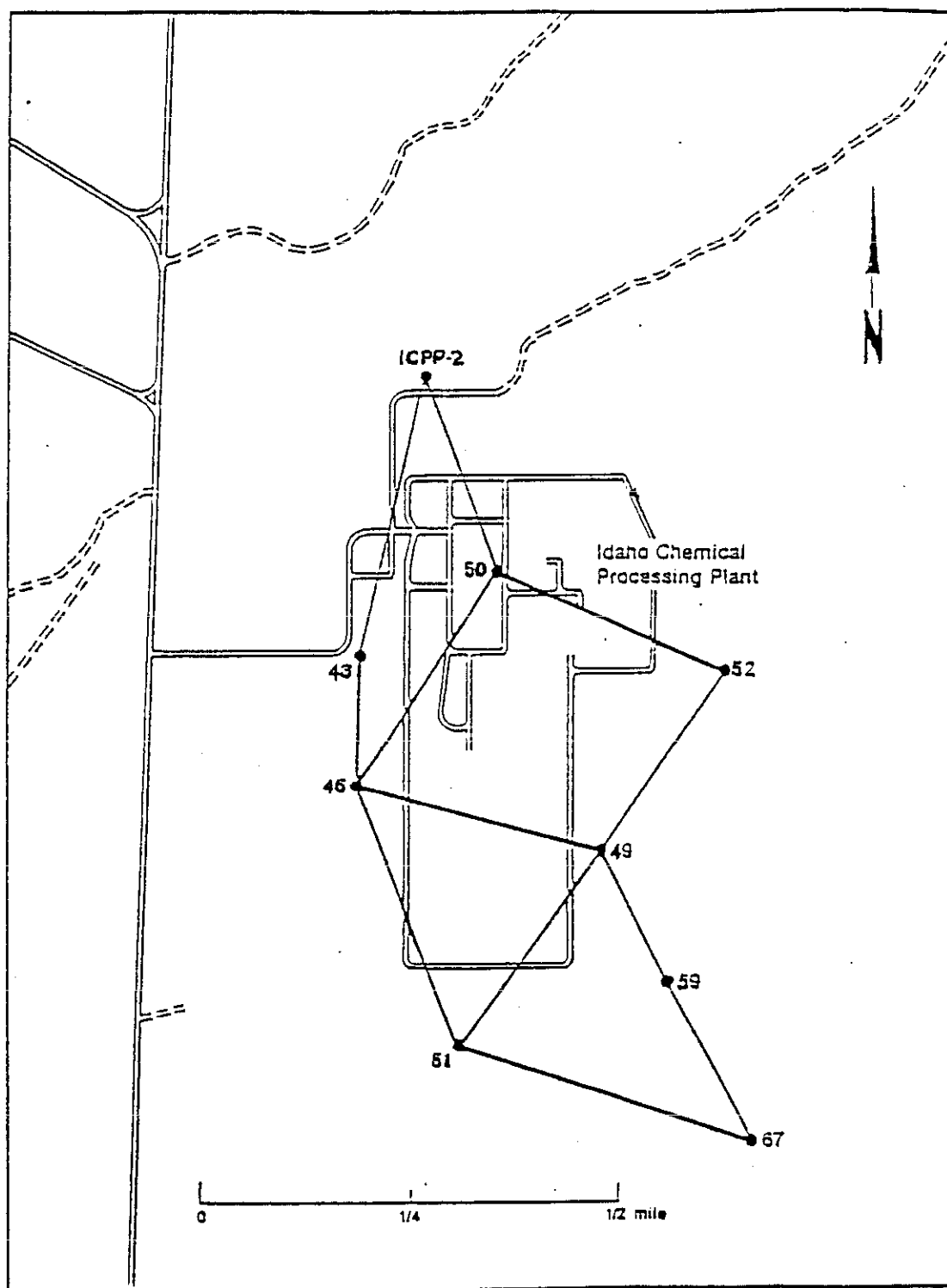


Figure 5. Location Map of Wells Used for Fence Diagram,
Wells Which Surround ICPP

NOTE: Interbeds are identified and correlated by like number.

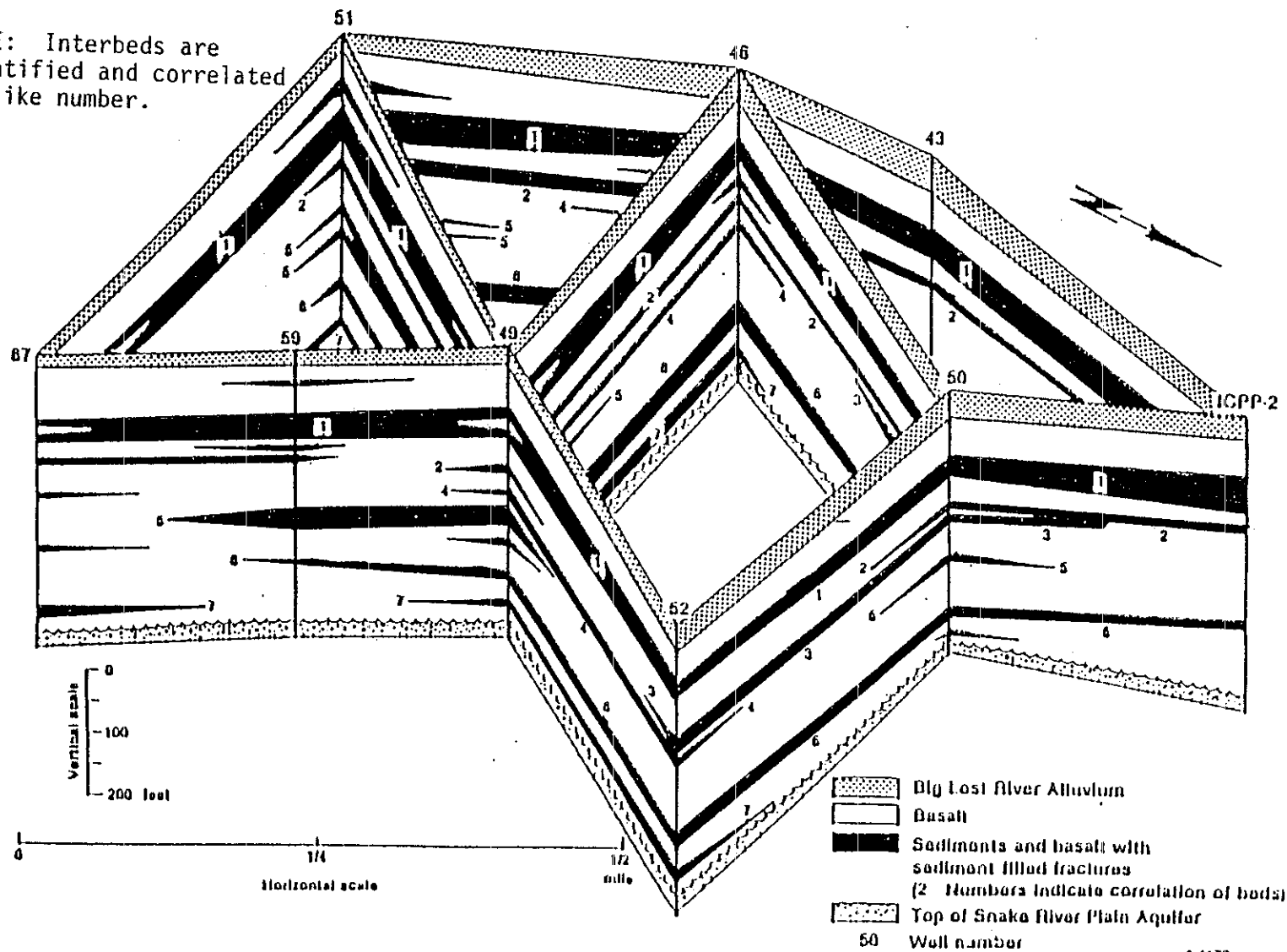


Figure 6. Geologic Cross Section Fence Diagram, Circular Line of Wells Which Surround the ICPP

vesicular, olivine basalt. Open voids, large cavities, lava tubes, and clay-filled fractures and seams are occasionally present within these basalts. Composition of the interbeds is yet to be determined. This sequence of flows and interbeds extends for a depth of 2,000 to 3,000 feet (Doherty et al. 1979).

Underlying these basalt flows is a thick (5,000 feet) sequence of welded rhyolite tuffs. Interbedded within these welded tuffs are layers of tuffaceous sands, air-fall ash, and ash flow tuffs (Doherty et al. 1979).

The deepest rocks encountered at the INEL are a dense, hydrothermally altered, recrystallized, aphanitic rhyodacite porphyry. This unit extends from approximately 8,100 feet to below 10,300 feet (Doherty et al. 1979).

2.2 CPP-59 Site Geology

LDU CPP-59 is located on gravel fill that overlies alluvium deposited by the Big Lost River. The lithology of the alluvium consists of various grades of sand and gravel to a depth of approximately 38 feet. Below 38 feet and extending to 39.5 feet, a partially cemented, silty fine sand was encountered. Below the silty fine sand was a thin (1 ft.) gravelly sand overlying silt, which extended to the total depth of the boring. Auger refusal was encountered at a total depth of 43 feet and presumably represents the top of the basalt geology.

3. HYDROGEOLOGICAL CHARACTERIZATION

3.1 Hydrology of the ICPP

3.1.1 Surface Water

The only surface water feature in the area of the ICPP is the dry channel of the Big Lost River. This channel is located approximately 20 feet from the northwest corner of the ICPP (Figure 7). Water flow in the river is intermittent and flows on to the ICPP only during years with high spring snow melt run-off from the mountains. Even during these wet years, the river will normally only flow in the late winter and spring months. The last time there was recorded flow in the Big Lost River in the area of the ICPP was 1987. The general slope of the terrain for the ICPP is towards the river channel at about 0.07%.

3.1.2 Groundwater

The Snake River Plain Aquifer (SRPA) is the primary source of drinking water for most of eastern Idaho. Estimates show that nearly 2×10^9 acre-feet of water could exist in the aquifer (Robertson et al. 1974). Regional flow in the Snake River Plain Aquifer is northeast to southwest; however, local flow in the area of the ICPP is more north to south (Figure 8). Depth to this

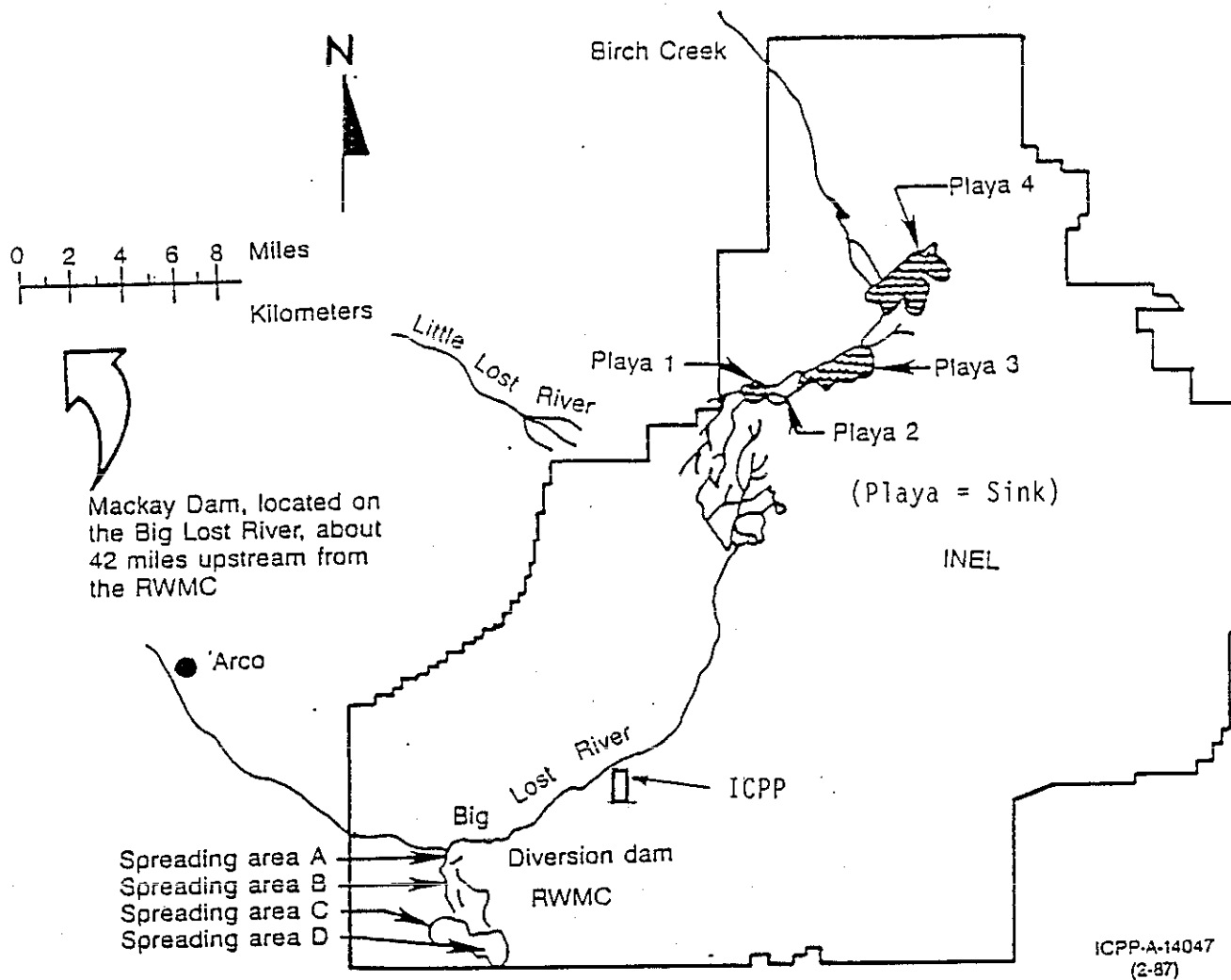


Figure 7. Surface water features at or near the INEL
(Robertson, et al., 1974)

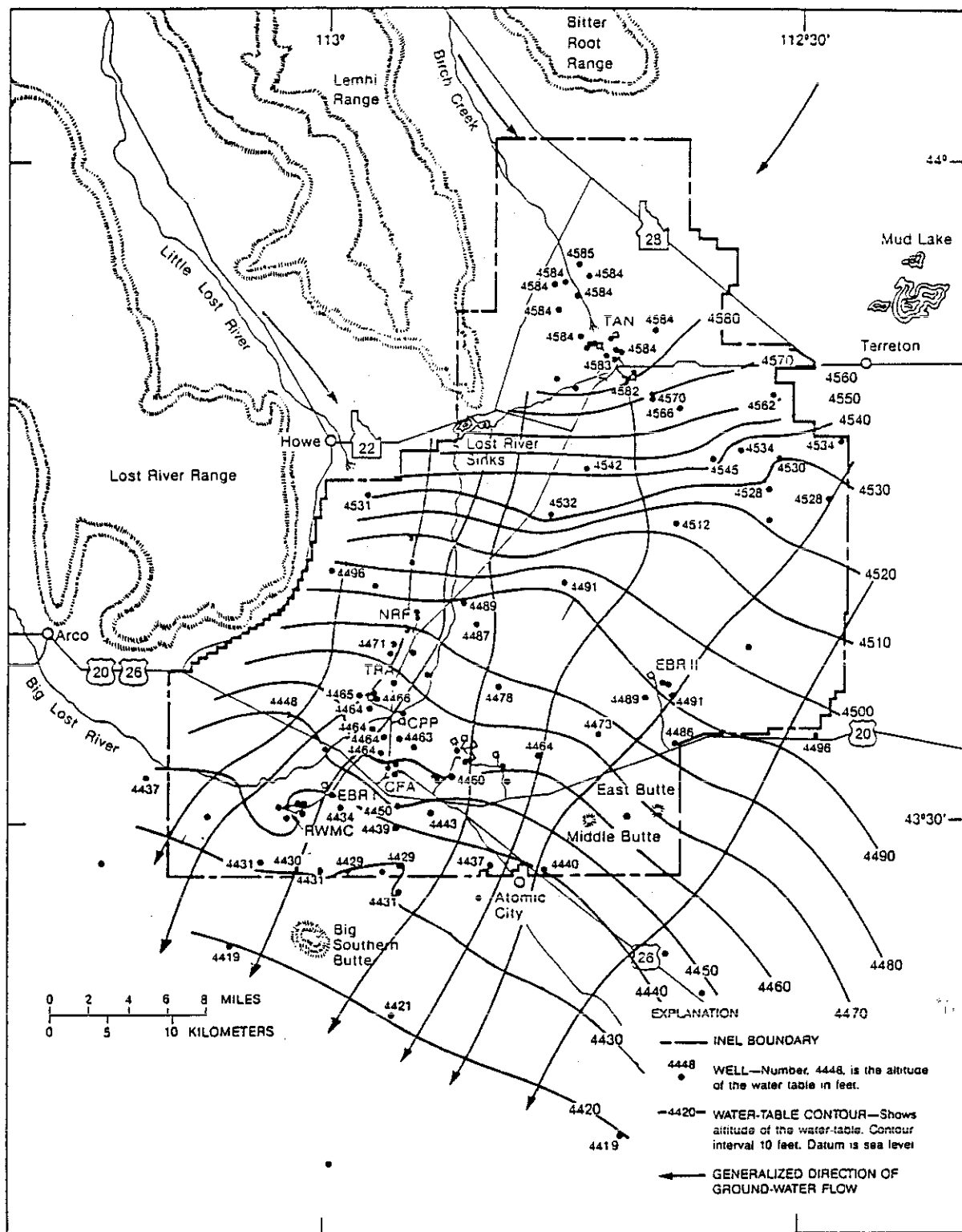


Figure 8. Altitude of the water table for the Snake River Plain aquifer and general direction of ground-water movement, July 1985.

aquifer in the vicinity of the ICPP is approximately 450 feet. The results of pump tests at various depths indicate that the upper 200 to 300 feet of the SRPA are the most porous and account for most of the flow. Based on these results and variations in hydraulic conductivities of the basalt, the effective base of SRPA is estimated to be 750 to 800 feet below the surface (Mann 1986).

Pump tests have been conducted on the Snake River Plain Aquifer to determine the suitability for water supply. Transmissivity of the aquifer ranges from 4,000 to 2.4 million ft^2/day with a geometric mean of 156,000 ft^2/day (Hull 1986). Storage coefficients are relatively high, reflecting water table conditions in the SRPA. Estimates of porosity of the aquifer range from 5% to 15%, with 10% being the most accepted value. This porosity estimate is a spatial average over a large volume since the aquifer is composed of massive basalt with a porosity of only a few percent and fractures and cinder zones with very high porosity.

Many other wells have been tested at the INEL, but only specific capacity (gpm/ft of drawdown) was determined. Many of the observation wells were tested upon completion. However, these monitoring wells were usually tested with a relatively small pump, so no measurable drawdown was achieved in the wells (Lewis and Goldstein 1982). For the ICPP area, the expected transmissivity is about 260,000 ft^2/day (Hull 1986).

3.1.3 Unsaturated Zone

Due to the low permeability of the sedimentary interbeds and fracture filling by clayey layers overlying basalt, various perched water zones are formed as surface infiltration percolates down through the basalt. There are four perched zones of interest. These zones occur at:

- the sediment/basalt interface (approximately 40 to 50 feet below ground)
- the 110-foot interbed (a zone of thin basalt flows and sediment interbeds approximately 90 to 110 feet below ground and averaging approximately 50 to 60 feet thick)
- the 265-foot interbed (a low permeability cinder zone approximately 265 feet below ground and approximately 30 feet thick)
- the 365-foot interbed (another low permeability clay interbed approximately 365 feet below ground and approximately 20 feet thick).

The actual areal extent of these perched water zones is under investigation. According to Cooper (1988), there does not appear to be a hydraulic connection between the regional Snake River Plain Aquifer system and the perched zones in that pumping one zone has no apparent effect on the water level in the other.

Table 1 summarizes the hydraulic and physical properties of the sediments at the ICPP. Measurements of hydraulic and physical properties of the basalt are summarized in Table 2. The average percent saturation content increases with depth while the average permeability decreases. The geometric mean of the vertical hydraulic conductivity decreases from 0.59 feet/day for surficial sediments to 0.019 feet/day for shallow interbeds to 0.008 feet/day for deep interbeds (Mann 1989).

4. METEOROLOGY

4.1 Temperature

Average monthly maximum temperatures at the INEL range from 87°F in July to 28°F in January. Average monthly minimum temperatures range from 49°F in July to 4°F in January. The warmest temperature recorded was 101°F, and the coldest temperature through January 1982 has been -40°F.

4.2 Wind

The average wind speed at the INEL is about 5 miles per hour in December and maximum of 9 miles per hour in April and May. The highest maximum hourly average speed was 51 miles per hour, measured at the 20-foot level at CFA from the west-southwest. Peak gusts of 78 and 87 miles per hour have been observed. Calm conditions prevail 11% of the time.

Table 1. Hydraulic and Physical Parameters of the Sedimentary Materials from the ICPP Area, INEL

Sample location	Depth (ft)	Permeability (cm/sec)	Porosity (%)	Moisture (%)	USCS Symbol
Well 121	10.0	7×10^{-4}	36.3	1.3	GM-GP
Well 121	402.0	5×10^{-8}	41.6	25.5	CL
Well 121	524.0	4×10^{-4}	39.9	21.8	SM
Well 121	738.2	9×10^{-9}	39.5	23.3	CL
Well 123	107.7	2×10^{-3}	61.7	39.8	SM
NWCF 1	10	9×10^{-2}	29 _a	4 _a	GW
NWCF 8	20	7.8×10^{-2}	29 _a	4 _a	SW
NWCF 8	30	8.1×10^{-1}	29 _a	4 _a	GW
NWCF 10	40	1.6×10^{-1}	29 _a	4 _a	SP
FAST 8	24.5	1.2×10^0	---	4.7 _a	GP
FAST 9	34.5	5.3×10^{-2}	---	4.7 _a	SP
FAST 10	39.5	1.0×10^{-6}	---	4.7 _a	SM/SC
FPR 1NW	8.5	4×10^{-3}	29 _b	6	SP
FPR 1NW	23.5	1×10^{-1}	29 _b	6	GP
FPR 1NW	36.0	2.9×10^{-2}	29 _b	6	SP/SM
FPR 2SE	14.5	4×10^0	29 _b	6	GP
FPR 2SE	25.7	9.0×10^{-2}	29 _b	6	GW-GM
FPR 2SE	31.7	2.9×10^{-2}	29 _b	6	SP-SM
7th 1	30	2.6×10^{-2}	29 _c	4.2	GW
7th 6	10	6.9×10^{-3}	29 _c	4.2	SW

NOTES:

a Average porosity

b Extrapolated from data

c Taken from literature

NWCF x = refers to boreholes at the New Waste Calcining Facility

FAST x = refers to boreholes at the Fuel Storage Facility

FPR x = refers to boreholes at the Fuel Processing and Recovery Facility

7Th x = refers to boreholes at the 7th bin set

Table 2. Hydraulic and Physical Properties of the Basalt at the ICPP Area, INEL

Sample Location	Depth	Permeability (cm/sec)	Porosity (%)	Moisture (%)
Well 121	52.2	1×10^{-7}	20.8	1.5
Well 123	119.0	3×10^{-5}	17.5	2.1
Well 123	435.8	6×10^{-8}	16.3	1.3
Well 123	728.8	2×10^{-7}	26.4	7.3

4.3 Precipitation

The average annual precipitation at the INEL is 9.07 inches of water. The yearly totals range from 4.50 to 14.40 inches. Individual months have had as little as no precipitation to as much as 4.42 inches. Maximum observed 24-hour precipitation amounts are less than 2.0 inches and maximum 1-hour amounts are just over 1.0 inches.

About 26.0 inches of snow fall each year. The maximum yearly total was 40.9 inches, and the smallest total was 11.3 inches. The greatest 24-hour total snowfall was 8.6 inches. The greatest snow depth observed on the ground was 27 inches. January and February average about 7.0 inches for a monthly maximum snow depth on the ground. The ground is usually free of snow from mid-April to mid-November.

4.4 Evaporation

While extensive evaporation data has not been collected on the INEL, evaporation information is available from Aberdeen and Kimberly, both located on the Snake River Plain in southeastern Idaho, which is similar to the climatic conditions of the INEL. The data from these areas would be representative of the INEL region and indicates that the average annual evaporation rate is about 42 inches. Recent data from Rexburg, Idaho, located approximately 75 miles east northeast of the ICPP indicates a similar evaporation rate. About 80% of the evaporation, 29 inches/year, occurs from May through October.

4.5 Summary

The above information is provided as a general overview of the climatic conditions at the ICPP. September, the time of the two spills, is a month with high average temperatures and low precipitation. The high average temperature coupled with the high evaporation rate and constant winds probably contributed to a major portion of the spills evaporating into the atmosphere. The low precipitation rate during this period means there would be little hydraulic driving conditions to force the migration of kerosene into the soils.

5. WASTE TYPES KNOWN OR SUSPECTED

Kerosene is the only material known or suspected of having been released to the environment at the CPP-59 site. An Unusual Occurrence Report (#83-52) recorded two known kerosene spills during September 1983, which resulted in approximately 260 gallons overflowing from a storage tank to the soil. It is estimated that the spill was contained in an area less than 6,000 square feet (.14 acre).

The presence of kerosene in the environment is evaluated through analysis of VOC and TPH (Simpson 1990). Results of samples collected at the site are illustrated in Table 3. Xylene was the only VOC detected in the samples associated with the kerosene spills. Other compounds that may be present such as base, neutral, acid organics (BNA), and semi-volatile organics are included with total petroleum hydrocarbon analyses.

TABLE 3
Sample Analysis Results
Land Disposal Unit CPP-59

Borehole	Depth, feet	Xylenes (ppb)	Total Petroleum Hydrocarbons (ppm)
CPP-59-01 Outside Berm	0-2	5 U	480
	2-4	4 J	28
	4-6	1 J	76
	6-10	5 U	18 U
	17-19	5 U	17 U
	24-26	5 U	18 U
	30-32	5 U	18 U
	38-39.7	25 U	0.9 J
	39.7-40	1 J	N/A ²
CPP-59-02 Outside Berm	0-2	6	3800
	2-4	11	310
	4-6	5 U	19
CPP-59-03 Outside Berm	0-2	5 U	62
	2-4	2 J	90
	4-6	8	120
CPP-59-04 Outside Berm	0-2	6	34
	2-4	4 J	17 U
CPP-59-04D Outside Berm	0-2	5	28
	2-4	4 J	20
	4-6	5 U	23
CPP-59-05 Outside Berm	0-2	2 J	13
	2-4	5 U	18
	4-6	5 U	9.4
CPP-59-06 Inside Berm	0-2	25 U	11
	2-4	25 U	6
	4-6	25 U	4.9
CPP-59-07 Inside Berm	0-2	25 U	26
	2-4	25 U	0.21 J
	4-6	25 U	3.4
CPP-59-08 Inside Berm	0-2	25 U	28
	2-3	25 U	12
	3-4	25 U	15
	4-6	25 U	3.7
CPP-59-09 Inside Berm	0-2	25 U	8.9
	2-4	25 U	0.68 J
	4-6	25 U	1.5
CPP-59-10 Outside Berm	0-2	25 U	2.3
	2-4	25 U	1 U
	4-6	25 U	0.42 J
	12.1-13.8	25 U	1 U
	19.1-20.1	25 U	1 U
	23-24	25 U	1 U
	28-29	25 U	1 U
	33-35	27 U	1 U
	38-40	26 U	4.8
	40-42	27 U	0.67 J
	42-43.5	28 U	3.4
Maximum Value		11	3800
Minimum Value		1	0.21 J
Detection limit range ³		5 - 28	1 - 18

U - Compound was analyzed for but not detected, the reported value is the sample detection limit.

J - Indicates the compound was analyzed for and detected, the reported value is below the routine sample detection limit.

¹EPA Method 8015 was used to quantitate for total petroleum hydrocarbons. Based on the hydrocarbon distribution present, samples may have been quantitated to reference standards of kerosene, diesel, motor oil or bunker C fuel oil.

²Indicates insufficient sample was available to collect a representative sample for this analysis.

³The detection limit range varies due to the sample dilution prior to analysis to obtain a result within the calibrated range of the laboratory instrument and due to the sample moisture content.

Table 3 illustrates that the majority, greater than 98%, of the organic compounds associated with the kerosene is present in the upper 6 feet of the soil. Based on the total area contaminated to 6 feet (6,000 ft/sq within bermed boundary), the soil contains an average of less than .002% kerosene (0.0001 ppm).

5.1 Analytical Results

The majority of the 260-gallon spill is assumed to have occurred within the bermed area (6,000 square feet). The specific dimensions of the spill boundary are unknown. Four shallow borings representing 13 samples were collected inside the bermed area. No VOCs were detected in any of the samples. The average TPH concentration for all of the samples inside the bermed area is 9.3 ppm, representing soils to a depth of 6 feet. This value is below the level of concern for soils contaminated with petroleum products for 16 of 20 states that have published cleanup standards. The range of cleanup standards for these states varies from 10 to 100 ppm TPH (Simpson 1990).

Five shallow and two deep boreholes representing 34 samples were collected outside the berm. Borehole locations in this area were limited by underground utilities, construction activities, and overhead interferences. Six of seven holes are concentrated around building CPP-702. This area is frequented by vehicle travel and parking. Boreholes 01, 02, 03, 04 and 04D are located in this area. Any one of these boreholes could have been located near or over an oily product spill associated with the frequent vehicle use of this area.

This area is also used for off-loading of petroleum products. Accordingly, numerous small kerosene spills associated with off-loading of kerosene may have occurred in this area. The 34 samples from boreholes in this area average 159 ppm TPH. Again, the majority greater than 90% of the TPH, is present in the upper 6 feet of the soil. Boreholes 01, 02, 03, 04 and 04D contain the highest concentration of TPH. It is assumed that the high TPH concentration in soil at these borehole locations is not associated with kerosene spills, but with other petroleum products. Therefore, this area cannot be considered as part of the unit boundary. TPH values from the remaining boreholes outside the berm exhibit concentrations below established limits.

Of the 14 samples associated with the two deep boreholes, only two contained TPH concentrations above the detection limits. Both of these samples contained less than 5 ppm and were collected from borehole 10. This limit is inconsequential with respect to human health and the environment. No VOCs were detected at depths below 6 feet. Five of the 20 samples collected outside the berm contained detectable concentrations of xylene ranging from 5 to 11 ppb. The recognized limit for soil contaminated with gasoline (similar to kerosene) is 10,000 ppb xylene (Simpson 1990). Therefore, the xylene poses no risk.

5.2 Risk Evaluation

With regards to risk, benzene is the most significant hazardous constituent associated with petroleum spills. Its risk factor is 2.65×10^{-5} . Three

other compounds, toluene, xylene, and ethyl-benzene, are considered in petroleum spill assessments. These compounds have risk factors less important than benzene. VOC analyses at the site indicate only the presence of xylene in 4 of the 47 samples at concentrations ranging from 5 to 11 ppb.

The following risk evaluation information for xylene, the only degradation component of kerosene detected at the site, is taken from Golder (1990d).

Xylene has been associated with noncarcinogenic adverse health effects. A soil concentration screening criterion was derived as recommended in the RCRA Facility Investigation Guidance (EPA, 1989b) for a sensitive population (16 kg child, ingesting 200 mg soil/day for a 5 year exposure period). This soil concentration, based on a chronic allowable intake for a sensitive population (i.e., chronic reference dose), is 160,000 mg/kg. The highest level of xylene identified in soils is only 0.011 mg/kg. Thus, the level of xylene detected would not pose a systemic health risk for individuals accidentally ingesting soils at LDU CPP-59.

The soil concentration of xylene is also evaluated with respect to the potential contribution by xylene to airborne contamination levels. A commonly recognized occupational limit for substances in air is the Threshold Limit Value (TLV). The TLV is a recommended exposure level in air expressed as mg/M³ (ACGIH, 1989). Given the maximum soil concentration identified of 0.011 mg/kg (expressed as mass/mass) and the limited areas of soil contamination (i.e., total mass of contaminated soil), dispersion and diffusion of volatile xylene in the ambient air would result in air concentrations far below the corresponding TLV. Cumulative risks at this site are insignificant.

5.3 Kerosene Migration

According to Calabrese and Kostecki (1989), when relatively large volumes of bulk hydrocarbon migrate through the soil, a small amount of the total hydrocarbon volume will become attached to the soil particles (immobile saturation) due to capillary forces. If the volume of bulk hydrocarbon (i.e.,

petroleum and its products) migrating through the soil is small relative to the surface area, the bulk hydrocarbon will eventually become exhausted as it is converted into immobile (residual) saturation. Downward migration will cease when this conversion is complete. This appears to be the case at LDU CPP-59. The amount of material spilled is relatively small in comparison to the area. Based upon these factors and the analytical results, the possibility of further migration is negligible.

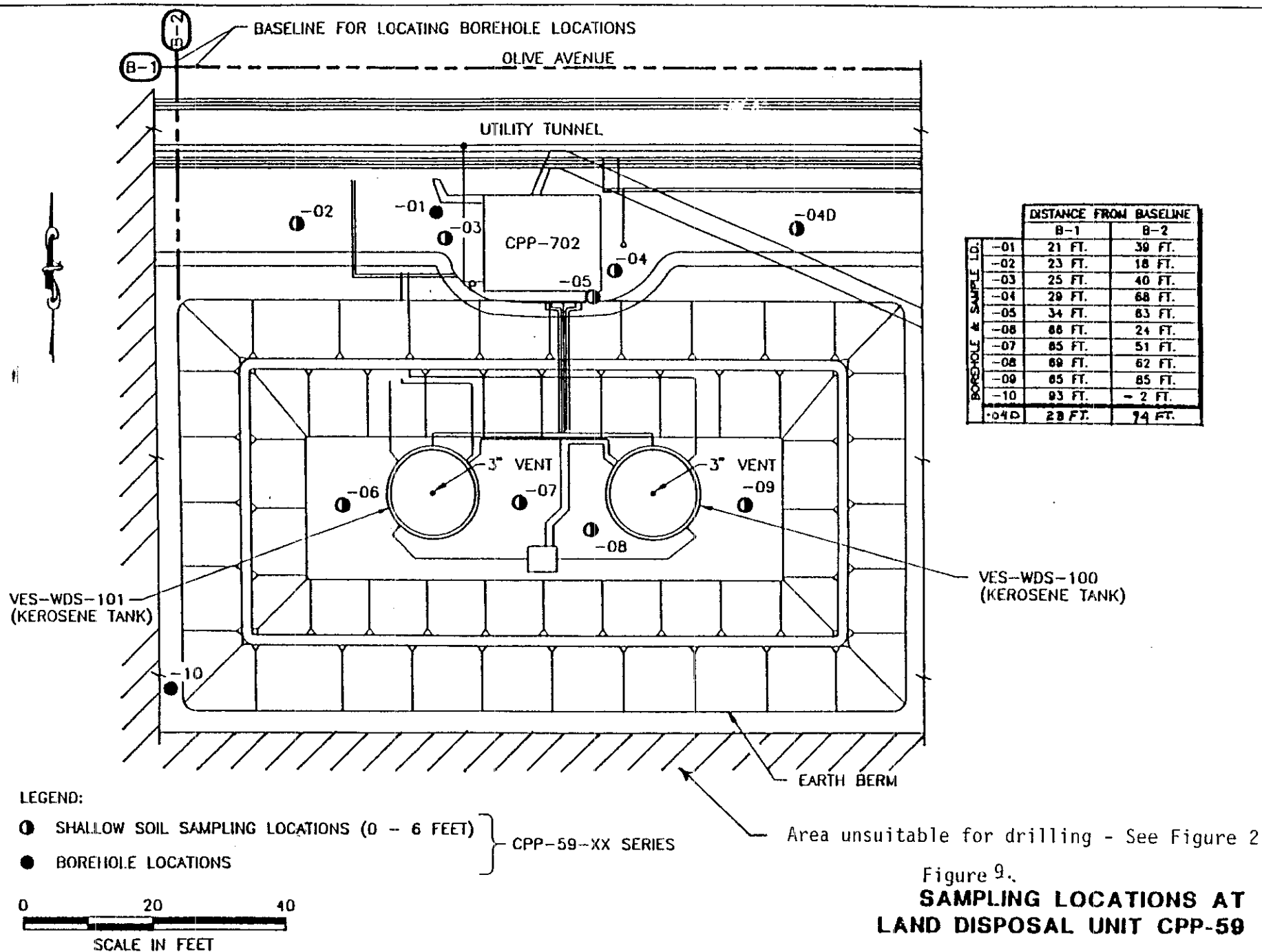
6. PRE-CLOSURE SAMPLING AND ANALYTICAL RESULTS

6.1 Unit Sampling

6.1.1 Sampling and Drilling

Access for drilling at this unit was limited due to the presence of overhead electrical utilities, building CPP-702, the kerosene tanks, the containment berm, and buried and surface pipelines. Because of these physical constraints, soil sampling was accomplished with a combination of hand and hollow stem augering. Sampling locations were selected based on areas likely to be affected by the reported spills while avoiding physical obstacles and utilities. All sampling locations are indicated on Figure 9.

Hawley Brothers Drilling of Blackfoot, Idaho, was contracted to conduct the drilling at CPP-59, while Golder Associates Inc., handled the sampling operations. These operations took place



between June 20, 1990, and June 26, 1990. Prior to drilling, the drill rig was decontaminated by high pressure steam cleaning. Golder Associates personnel visually inspected the drill rig and downhole tools for grease, hydraulic fluid, and other visible materials that could potentially contaminate the borehole.

The shallow soil sampling at CPP-59 was accomplished entirely with a hand auger. These borings were advanced to a depth of 6 feet or until refusal was encountered. Samples were generally collected at depths of 0 to 2, 2 to 4 and 4 to 6 feet. Figure 9 shows the location of these shallow borings.

Two 40-foot borings were drilled and sampled from the surface to 6 feet with a hand auger. The remainder of these boreholes were drilled with a powered hollow stem auger from a truck-mounted CME-55 drill. The locations of these deep boreholes are shown in Figure 9. Samples were obtained by driving a 24-inch by 4-inch OD California-split spoon sampler containing a 24-inch clear lexan inner barrel with a rig mounted, cathead-operated, 140-pound safety hammer. The Lead Geologist recorded the number of blows required to advance the sampler in 6-inch increments. After retrieving each split spoon, the air space within the lexan barrel containing the sample was monitored with an organic vapor analyzer (OVA) or monitor (OVM). OVA or OVM response observed above the ambient air readings was recorded in the field logbook. All samples were screened for radiation by WINCO HP personnel. The

atmosphere near the drilling area was monitored during all field activities for explosive atmospheres using an MSA Model 260 explosimeter.

6.2 Sample Handling and Analysis

Samples were processed by laying out a fresh length of protective plastic on the processing table. The caps on the upper end of the lexan inner barrel were then removed and the upper 2 to 4 inches of material were discarded. Grab samples for volatile organics were then immediately placed into 2-ounce glass jars. Samples were placed into the container such that little or no headspace was present; the containers were immediately sealed with a teflon-lined lid and temporarily placed in a shipping container with coolant for preservation.

The remaining sample material was transferred into a decontaminated stainless steel mixing bowl and mixed thoroughly using decontaminated stainless steel utensils. Granular material 1 to 2 inches in size was discarded. A sub-sample of the remaining material was transferred to an 8-ounce glass sample container for TPH analysis. Any remaining sample material was discarded into a waste container for subsequent disposal by WINCO personnel. The samples were labeled and placed into an appropriate shipping container with the necessary amount of coolant for maintaining the samples at 4°C. Samples were then transferred by overnight carrier under chain-of-custody to the analytical laboratory.

All samples from boreholes CPP-02, -03, -04, -04d, and -05 were sent to Pacific Northwest Testing Laboratory, Inc. (PNELI) of Redmond, Washington, for analysis. The samples from 0 to 38 feet were also analyzed at PNELI, with the exception of the volatile analysis for the 0 to 2 foot sample. All samples from boreholes CPP-06, -07, -08, -09, and -10 were sent to Controls for Environmental Pollution (CEP) of Santa Fe, New Mexico. The 38 to 40 foot sample from borehole CPP-01 was also analyzed at this lab. The 0 to 2 foot sample from borehole CPP-01 had the volatile analysis conducted at CEP.

6.3 Quality Assurance/Quality Control

Quality Assurance/Quality Control Procedures (Golder 1990c), were implemented during the sampling and analysis program for CPP-59. This Golder QA Program Plan was developed in compliance with the requirements of ANSI/ASME NQA-1, (ASME 1986), which is defined as the preferred standard for all projects conducted at nuclear facilities by U.S. Department of Energy (DOE) Order 5700.6B, Quality Assurance (DOE 1986).

6.3.1 Blanks

Trip blanks were submitted for volatile organic analysis in all sample shuttles. No target organic compounds were detected in the trip blanks.

Three equipment blank samples were submitted for volatile organic compound analysis and one for TPH analysis. The blanks were prepared by decontaminating the sample processing equipment as described in Section 5 of the Technical Work Plan, Vol. I (Golder 1990a) followed by a final rinse with deionized water and collection of the rinseate in the proper containers.

6.3.2 Field Duplicates

Three sets of field duplicate samples exhibited positive results for TPH. Relative percent differences (RPD) between the duplicate results ranged from 9 to 66%. The one duplicate set that exhibited the high RPD (66%) had one measurement near the sample detection limit of 1 ppm. The EPA data validation guidelines recommend that the RPD for laboratory duplicates fall within a control limit of $\pm 20\%$ for water samples and $\pm 35\%$ for soils when sample values are greater than 5 times the sample detection limit (EPA 1988a). Therefore, duplicate samples that were collected met EPA guidelines.

6.3.3 Performance Audit Samples

Performance audit samples were prepared and submitted for analysis. The samples were prepared by spiking laboratory prepared deionized water with a quality control reference sample obtained from the U.S. EPA Environmental Monitoring and Support Laboratory in Cincinnati, Ohio. All the detected sample analysis results submitted from the laboratories were within the EPA defined control limits for each parameter of interest.

6.4 Data Validation

All sample analysis results were reviewed and validated in accordance with Section 8 of the Technical Work Plan, Vol. I (Golder 1990b) and with the EPA data validation guidelines (EPA 1988a, 1988b). All soil samples to be analyzed for volatile organics were analyzed within 7 to 14 days. All soil samples to be analyzed for TPH were analyzed within 28 days with a 14 day extraction holding time.

6.5 Laboratory Analyses Results

Volatile organic compounds and TPH were detected in the validated samples from LDU CPP-59, and the results are presented in Table 3.

Xylene was detected in six of the borings with concentrations ranging from 1 to 11 ppb. The detection limit range varied from 5 to 28 ppb.

Xylene was below the method detection limits. The highest concentration was observed in borehole CPP-59-02 at 11 ppb at the 2 to 4 foot interval. Though xylene was detected at LDU CPP-59, it is present only to the extent it would be naturally occurring in the kerosene as a degradation component.

TPH was detected in all of the boreholes at concentrations ranging from 0.21 to 3,800 ppm. The highest overall concentrations were observed in borehole CPP-59-02 at 0 to 2 feet (3,800 ppm), 2 to 4 feet (310 ppm) and 4 to 6 feet (19 ppm). TPH was also detected at the 38 to 44 foot depths in both boreholes CPP-59-01 and -10 at concentrations ranging from 0.67 ppm to 4.8 ppm. The TPH analysis results originally reported by one of the contract laboratories, PNELI, reported the results quantitated to 4 reference hydrocarbon standards: kerosene, diesel, motor oil, and bunker C fuel oil based on the similarities of the hydrocarbon distribution in the samples. The results presented in Table 3 report the highest TPH concentration quantitated in the sample based on the four reference materials used by the laboratory. These concentrations are below the regulatory concern associated with petroleum spills.

7. CLOSURE PROCEDURES

Since no RCRA wastes have been disposed at CPP-59, the unit is not subject to RCRA closure requirements. Technical data collected to date indicates that the kerosene spilled at the site is not ignitable and that hazardous constituents associated with the spill are not present in concentrations of concern. Since no RCRA wastes are associated with activities at this unit, no further closure activities are recommended.

8. AREA RESTORATION PROCEDURES

All excavations associated with boreholes have been filled to grade with native soils excavated during previous projects at the ICPP.

Since the unit is located within the ICPP perimeter where the soils are chemically controlled to prevent growth, vegetation will not be reestablished at the unit.

9. OTHER TOPICS OF CONCERN

At this time no other topics of concern have been identified with CPP-59.

10. SCHEDULE OF ACTIVITIES

Since no further RCRA closure activities are recommended for this site, a schedule is not needed.

11. POST-CLOSURE

Because no further RCRA closure activities are planned for this site, there is no plan for post-closure care proposed.

12. REFERENCES

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APPENDIX A

I. General Information

Chemical Name & Synonyms Petroleum Distillate	Trade Name & Synonyms 400 LAS-K/Kerosine
Chemical Family Petroleum Hydrocarbon	Formula N/A
Proper DOT Shipping Name Kerosene, Combustible Liquid UN 1223	DOT Hazard Classification Combustible Liquid
Manufacturer Petro Source Refining Corporation	Manufacturer's Phone Number *(801) 322-4750
Manufacturer's Address 135 South State - S.L.C., UT 84111	Chemtrec Phone Number *(800) 424-9300

II. Ingredients

Principal Hazardous Components	Percent	Threshold Limit Value (units)
Complex mixture of paraffinic,	100	5 mg/m ³
olefinic, naphthenic and aromatic		
hydrocarbons.		

III. Physical Data

Boiling Point (°F) 375 to 500 @ 766 mm Hg	Specific Gravity (H ₂ O = 1) .7870 @ 60 degrees F
Vapor Pressure (mm Hg.) 577 degrees F: 1	Percent Volatile By Volume (%) 100
Vapor Density (Air = 1) 8	Evaporation Rate (_____ = 1) less than 0.01 (n-Butyl Acetate: 1)
Solubility in Water Insoluble	pH N/A
Appearance & Odor Clear with mild petroleum odor.	

IV. Fire & Explosion Hazard Data

Flash Point (Test Method)	Auto Ignition Temperature	
160 degrees F PMCC	500 degrees F	
Flammable Limits	LEL	UEL
Volume % in air.	0.9	5.4
Extinguishing Media		
Dry chemical carbon dioxide, foam water spray.		
Special Fire Fighting Procedures Use water spray to cool exposed containers. Use a smothering technique for extinguishing fire of combustible liquid. DO NOT USE a forced water stream directly on fires as this will scatter the fire. Firefighters should wear self-contained breathing apparatus and full protective clothing.		
Unusual Fire & Explosion Hazards Flowing oil can be ignited by self generated static electricity. Containers should be grounded and bonded.		

SECTION V - HEALTH HAZARD DATA

THRESHOLD LIMIT VALUE:

None established.

EFFECTS OF OVEREXPOSURE

Eye Contact: Moderately irritating.

Skin Contact: May cause excessive drying and lead to dermatological problems.

EMERGENCY AND FIRST AID PROCEDURES

Eye Contact: Flush with running water at least 15 minutes continuously.

Skin Contact: Wash with soap and water.

SECTION VI - REACTIVITY DATA

STABILITY	UNSTABLE		CONDITIONS TO AVOID:
	STABLE	X	

INCOMPATIBILITY (MATERIALS TO AVOID FOR PURPOSES OF TRANSPORT, HANDLING AND STORAGE ONLY):

Oxygen and strong oxidizing materials.

HAZARDOUS DECOMPOSITION PRODUCTS:

HAZARDOUS POLYMERIZATION	MAY OCCUR		CONDITIONS TO AVOID:
	WILL NOT OCCUR	X	

SECTION VII - SPILL OR LEAK PROCEDURES

STEPS TO BE TAKEN IN CASE MATERIAL IS RELEASED OR SPILLED:

Contain spill. Protect from ignition. Absorb in dry, inert material (sand, clay, sawdust, etc.). Keep out of water sources and sewers. Refer to Section VIII and contact appropriate safety personnel for respirator requirements.

WASTE DISPOSAL (INSURE CONFORMITY WITH ALL APPLICABLE DISPOSAL REGULATIONS):

Incinerate or place in approved disposal facility.

SECTION VIII - PERSONAL PROTECTION INFORMATION

RESPIRATORY PROTECTION: NIOSH approved equipment per requirements of 29 CFR Part 1910.134 (OSHA) and ANSI Z88.2.

VENTILATION	LOCAL EXHAUST	Recommended
	MECHANICAL (GENERAL)	Recommended
	SPECIAL OR OTHER	

PROTECTIVE GLOVES: Rubber or neoprene

EYE PROTECTION: Goggles if splashes could occur

OTHER PROTECTIVE EQUIPMENT:

SECTION IX - HANDLING AND STORAGE PRECAUTIONS

PRECAUTIONS TO BE TAKEN IN HANDLING AND STORING:

Protect from sources of ignition. Store in cool, well-ventilated area. Provide means to control leaks and spills. Bond and ground during liquid transfer.

OTHER PRECAUTIONS: